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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|----------------------------------|------------------|
| 10/629,497 | 07/28/2003 | Scot Philip Sandoval | 97112.3300 | 6734 |
| 20322 | 7590 | 02/13/2007 | | |
| SNELL & WILMER 400 EAST VAN BUREN ONE ARIZONA CENTER PHOENIX, AZ 85004-2202 | | | EXAMINER WILKINS III, HARRY D | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1742 | |
| SHORTENED STATUTORY PERIOD OF RESPONSE | | MAIL DATE | DELIVERY MODE | |
| 3 MONTHS | | 02/13/2007 | PAPER | |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/629,497

Applicant(s)

SANDOVAL ET AL.

Examiner

Harry D. Wilkins, III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-21 and 23-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-21 and 23-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 8-14, 18 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young et al (US 5,622,615) in view of Goens et al (US 3,972,795).

Young et al teach (see figure 1 and example 7) a method of electrowinning copper including providing an electrolytic cell (4) containing at least one anode and at least one cathode, wherein the cathode has an "active" surface area, providing a flow of electrolyte through the electrolytic cell, the electrolyte including copper and solubilized ferrous iron, oxidizing at least a portion of the ferrous ions to ferric ions at the anode, removing (plating) at least a portion of the copper at the cathode and operating the cell at a voltage below 1.5 V and a current density greater than 26 A/ft² (~280 A/m²).

Young et al do not teach utilizing a flow-through anode.

Goens et al teach (see abstract, figures and cols. 2-3 and 7-8) a method of electrowinning copper including providing an electrolytic cell with flow-through anodes and cathodes, providing a flow of electrolyte through the cell, the electrolyte including copper and solubilized ferrous iron and removing at least a portion of the copper from the electrolyte at the at least one cathode. The flow-through cell was capable of higher efficiency than an electrowinning cell using non-flow-through electrodes.

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Therefore, it would have been obvious to one of ordinary skill in the art to have performed the process of Young et al in the flow-through cell of Goens et al because Goens et al teach that the flow-through cell provided increases in copper electrowinning efficiency.

Regarding claims 4-5, the disclosed voltage of Young et al can be as low as 1.03 Volts (which is less than about 1.0 Volts).

Regarding claims 6, 7 and 19, Young et al teach varying the flowrate of the electrolyte (see example 6) and describes it as a result effective variable. Therefore, it would have been obvious to one of ordinary skill in the art to have optimized the flow rate of the electrolyte in the electrolytic cell.

Regarding claims 8-9, Young et al teach (see col. 9, lines 28-39) using electrocatalyst coated titanium as the anode. Thus, the flow-through anode in the cell of Goens et al would have been made with the electrocatalytic coating and have performed the oxidizing of the ferrous iron.

Regarding claims 10-11, the electrolyte of Young et al contained 35 g/L Fe.

Regarding claims 12-14, the disclosed temperature of Young et al is 80°C (176°F). The range of temperatures disclosed by Young et al included 60°C (140°F)

Regarding claim 18, Young et al teach (see example 7) the process of electrowinning copper wherein circulation is used so that operation of the cell occurs at a voltage less than 1.5 Volts and at a current density of more than 26 A/ft². Goens et al provide the suggestion to use flow-through electrodes in order to enhance the efficiency of the copper electrowinning process.

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Regarding claim 20, it would have been obvious to one of ordinary skill in the art to have facilitated the electrolyte circulation by using a flow manifold because a flow manifold would have allowed easy distribution of the electrolyte to multiple cells simultaneously, thereby increasing productivity.

Regarding claim 21, it would have been obvious to one of ordinary skill in the art to have provided the flow of electrolyte into and through the flow through anode in order to allow the electrolyte to react with the anode to oxidize the ferrous ions to ferric ions before the electrolyte reached the cathode to avoid the ferrous ions interacting at the cathode.

3. Claims 15-17 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young et al (US 5,622,615) in view of Goens et al (US 3,972,795) as applied to claims 1 and 18 above, and further in view of Sandoval et al (US 5,492,608).

The teachings of Young et al and Goens et al are described above.

However, Young et al do not teach a recycling of electrolyte wherein at least a portion of the ferric ions are reduced back to ferrous ions to form a regenerated electrolyte.

Sandoval et al teach (see col. 7, lines 27-37) recycling a copper electrowinning electrolyte through activated carbon modules and exposing the electrolyte to sulfur dioxide gas to reduce the ferric ions back to ferrous ions to form a regenerated electrolyte which is fed back to the cell.

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the recycle line taught by Sandoval et al in the method of Young et al in

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order to effectively recycle the electrolyte to reduce waste. The activated carbon acts as a catalyst in the process.

Response to Arguments

4. Applicant's arguments filed 10 January 2007 have been fully considered but they are not persuasive. Applicant has argued that:

- a. Goens et al teach away from the presently claimed invention because specific disclosed embodiments operate at "low" copper concentrations compared to the copper concentrations utilized by Young et al.

In response, the teachings of Goens et al as to preferred embodiments at low copper concentrations (0.1-2 g/L) are not considered to be a direct teaching against using higher copper concentrations. A proper negative teaching would have been if Goens et al had indicated that the structure would not have been capable of operating at higher copper concentrations. Since it is clear that Goens et al does not teach that the system was inoperable at higher copper concentrations, it should be acknowledged that it would have been capable of operating at higher copper concentrations, such as those disclosed by Young et al.

- b. Goens et al provided operating parameters for that process which were divergent from the operating parameters of the process of Young et al, therefore, there is no motivation to combine.

In response, merely because Goens et al disclosed preferred operating conditions that were different from the operating conditions disclosed by Young et al, does not mean that one of ordinary skill in the art would not have sought to combine the

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teaching of an axial flow cell for copper electrowinning. Instead, particularly in col. 2, Goens et al teach that the axial arrangement improves current efficiency by having higher current drain at "earlier" electrodes where the electrolyte contained a higher concentration of copper, and by having lower current drain at "later" electrodes where the electrolyte contained a lower concentration of copper. Therefore, Goens et al teach the advantage of using the axial flow design to be improved current efficiency.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

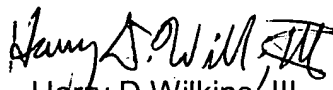
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Harry D Wilkins, III
Primary Examiner
Art Unit 1742

hdw